

REMARKS

Claims 28-50 are pending. Applicant has amended claim 28 herein.

In the Office Action dated May 7, 2007, the Examiner rejected claims 28-50 under 35 U.S.C. § 103(a) over Stapel (6,912,538). Applicant respectfully traverses this rejection.

Stapel describes a matrix traversal representation of a document type definition. An XML Document Type Definition (DTD) defines the types of elements that can appear in a document and a permitted set of relationships between document elements. For example, the DTD may define that a document can have elements of type A, B, and C, and that an element of type A can have child elements of type B or C, but not any other types. Stapel, col. 5:39-41, 8:52-57. Stapel converts the DTD schema into a set of tables, called a matrix representation, which is algorithmically easier to use for validating documents than the original DTD. Stapel, col. 6:66-7:12. A DTD only contains information about data types, not the instances of those types found in a document. Thus, Stapel does not address relationships between instances of data in a document

In contrast, applicant's technology converts a hierarchical model of data in a document (e.g., XML) to a new representation of the data, called the item, relation, attribute (IRA) model. Hierarchical models, such as XML, represent hierarchical relationships explicitly, such as by nesting elements. A difficulty with such hierarchical models is that there is no support for explicitly representing non-hierarchical relationships. For example, if the document contains a family tree in which children are in elements nested below their parents (a hierarchical parent-child relationship), then there is no explicit way to represent a relationship between two people in the tree that are friends (a non-hierarchical relationship). As a result, creators of documents adhering to a hierarchical model use various implicit mechanisms to represent non-hierarchical relationships. These mechanisms often involve repeating the data in each place where the entity referred to by the data has a relationship with another entity. For example, in the family tree, a friend element can be created below each of the two friends that repeats the

other persons name. Repeating data causes difficulty when validating the document and making changes to the document, because many instances of the same data may need to be located and changed.

The following XML illustrates the family tree example above.

```
<People>
  <Person Name="Albert"/>
    <Person Name="Bob">
      <Person Name="Chris"/>
        <Person Name="Don">
          <Friend Name="Bob">

```

In the above XML, a person Albert has a child named Bob, and a person named Chris has a child named Don. The parent-child relationship is explicit through the nesting of elements: the person element for Bob is a child of the person element for Albert. Don and Bob are friends. To represent this relationship, a new element type Friend is introduced and nested under the element Don. Notice that the person Bob now appears in two different places. There is only one entity Bob, but there are references to Bob throughout the XML. As the XML grows more complex, the repetition of data becomes more difficult to deal with.

Each of applicant's claims recites "wherein the current representation represents some relationships between entities hierarchically by nesting elements and other relationships non-hierarchically by referring to another element of the hierarchical model, such that the current representation contains multiple references to at least one entity," and "wherein only one item is created in the new representation for the at least one entity having multiple references in the current representation." Stapel does not teach or suggest converting a current representation of a document having multiple references to an entity to a new representation of the document that represents each entity with a single item. Stapel is primarily focused on a DTD and a DTD only contains information about data types, not data itself. Thus, Stapel does not describe repeated data and, in particular, any way of creating a new representation that does not repeat data.

In addition, even if the data types of Stapel can be treated the same as applicant's data (with which applicant disagrees), Stapel does not teach or suggest any way of removing repeated data types in the matrix representation that Stapel creates. As shown in Figure 1 of Stapel, the DTD may have more than one element describing data type X and more than one element describing data type A in the matrix representation. Stapel distinguishes the two nodes by the path used to reach them, "[t]he methods for defining the structured document presented herein overcome this problem and enable different values to be assigned to the element X depending on the path taken to reach the element." Stapel, col. 6:51-54. In contrast, applicant's technology identifies multiple references to an entity in the input representation and replaces them with a single item in the new representation. Figure 2 of applicant's specification provides an example. The XML representation on the right contains two references to Mary, whereas the new representation on the left contains a single item Mary. Therefore, applicant's claims are patentable over Stapel. Accordingly, applicant respectfully requests that these rejections be withdrawn.

Moreover, claims 28-35 as amended recite elements not described by Stapel, including " wherein identifying entities comprises parsing expressions of the elements of the current representation using parsing rules," " wherein creating the item comprises generating the new representation using generation rules that specify patterns for creating items of the new representation," and "wherein the new representation forms a data structure that can be traversed by relationships between entities such that a program can use the new representation to interpret hierarchical and nonhierarchical relationships in the same way." Nowhere does Stapel describe parsing expressions using rules, generation rules, or a data structure that can be traversed by relationships between entities. Therefore, these claims are patentable over Stapel for this additional reason.

Based upon these remarks and amendments, Applicants respectfully request reconsideration of this application and its early allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this

application, the Examiner is encouraged to call the undersigned at (206) 359-3265. Applicants believe all required fees are being paid in connection with this response. However, if an additional fee is due, please charge our Deposit Account No. 50-0665, under Order No. 418268851US from which the undersigned is authorized to draw.

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Respectfully submitted,

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